

### Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Please amend claims 13, 52, and 55 as indicated below (material to be inserted is in **bold and underline**, material to be deleted is in ~~strikeout~~ or (if the deletion is of five or fewer consecutive characters or would be difficult to see) in double brackets [[ ]]):

#### Listing of claims:

1. - 12. (Cancelled)

13. (Currently Amended) A transducer-based sensor system, comprising:  
a transducer array including a plurality of transducers, where at least one transducer in the transducer array is configured to have a sample material attached thereto, and where the transducers are surface acoustic wave devices;  
an output processing subsystem coupled with the transducer array; and  
a selector coupled with the transducer array and configured to selectively activate transducers within the transducer array by applying an enabling signal to the transducer array for at least one, but less than all, of the transducers, such that the transducer array includes at least one selected transducer and at least one unselected transducer, where:  
for a selected transducer, application of the enabling signal enables a transmission path between the selected transducer and the output processing subsystem, thereby permitting output signals to be transmitted from the selected transducer to the output processing subsystem,  
**where the transducer array includes a local drive signal generator for each transducer of the transducer array, and where activating one or more of the transducers within the transducer array includes closing a switch between the transducer to be activated and the local drive signal generator associated with such transducer;** and the transducer array is configured to isolate any unselected transducers from the output processing subsystem, where such isolation is obtained by disabling the

~~transmission paths, thereby substantially preventing output signals from being transmitted from the unselected transducers to the output processing subsystem.~~

14. - 26. (Cancelled)

27. (Previously Presented) A transducer-based sensor system, comprising:  
a transducer array including a plurality of transducers configured to be placed into operative proximity with a sample material, and configured to produce electrical output based upon drive signals applied to the transducers and upon the sample material, where at least one transducer in the transducer array is configured to have a sample material attached thereto;

an output transmission path associated with each transducer, each output transmission path being defined between its associated transducer and an output processing subsystem configured to receive electrical output from the transducers; and

a selector configured to control activation and deactivation of portions of the transducer array by enabling and disabling the output transmission paths such that each output transmission path is either enabled, thereby allowing transmission of electrical output from the respective transducer to the output processing system, or disabled, thereby preventing transmission of electrical output from the respective transducer to the output processing system; and

a local drive signal generator for each transducer, where the selector is configured to control transducer activation for each transducer by permitting drive signals to be applied from the local drive signal generator to the transducer if the output transmission path for transducer is enabled, and by preventing drive signals from being applied from the local drive signal generator to the transducer if the output transmission path for the transducer is disabled;

where each local drive signal generator is coupled with and controlled by the selector such that the local drive signal generator is enabled if the output transmission path of its associated transducer is enabled; and

where for each transducer, a switch is coupled between the transducer and the transducer's local drive signal generator, the switch being configured to close if the

output transmission path for the transducer is enabled, and to open if the output transmission path for the transducer is disabled.

28. - 30. (Cancelled)

31. (Previously Presented) A transducer-based sensor system, comprising:  
a transducer array including a plurality of transducers configured to be placed into operative proximity with a sample material, and configured to produce electrical output based upon drive signals applied to the transducers and upon the sample material, where at least one transducer in the transducer array is configured to have a sample material attached thereto, and where the transducers are configured to provide both bulk wave and surface wave modes of operation;

an output transmission path associated with each transducer, each output transmission path being defined between its associated transducer and an output processing subsystem configured to receive electrical output from the transducers; and

a selector configured to control activation and deactivation of portions of the transducer array by enabling and disabling the output transmission paths such that each output transmission path is either enabled, thereby allowing transmission of electrical output from the respective transducer to the output processing system, or disabled, thereby preventing transmission of electrical output from the respective transducer to the output processing system.

32. - 36. (Cancelled)

37. (Previously Presented) A method of performing sensing operations on a sample using a transducer array having a plurality of transducers, the method comprising:

attaching the sample to at least one transducer in the transducer array;  
operating the transducer array sequentially through a plurality of different states,  
where the method includes, for each state:

activating one or more of the transducers within the transducer array,  
which includes applying a drive signal to the transducer and receiving a  
corresponding output signal for the transducer at an output processing  
subsystem; and

isolating all non-activated transducers within the transducer array to  
inhibit coupling of noise contributions from the non-activated transducers to the  
output processing subsystem,

where the transducers which are activated are varied from state to state as the  
transducer array is operated through the plurality of different states, thereby permitting  
output to be obtained for different portions of the transducer array at different times; and

where the transducer array includes a local drive signal generator for each  
transducer of the transducer array, and where activating one or more of the transducers  
within the transducer array includes closing a switch between the transducer to be  
activated and the local drive signal generator associated with such transducer.

38. (Previously Presented) A method of performing sensing operations on a sample using a transducer array having a plurality of transducers, the method comprising:

attaching the sample to at least one transducer in the transducer array;

operating the transducer array sequentially through a plurality of different states, where the method includes, for each state:

activating one or more of the transducers within the transducer array, which includes applying a drive signal to the transducer and receiving a corresponding output signal for the transducer at an output processing subsystem; and

isolating all non-activated transducers within the transducer array to inhibit coupling of noise contributions from the non-activated transducers to the output processing subsystem,

where the transducers which are activated are varied from state to state as the transducer array is operated through the plurality of different states, thereby permitting output to be obtained for different portions of the transducer array at different times; and

where the transducer array includes a local drive signal generator for each transducer of the transducer array, and where activating one or more of the transducers within the transducer array includes enabling the local drive signal generator associated with the transducer to be activated and closing an input switch coupled between the local drive signal generator and the transducer to be activated.

39. - 51. (Cancelled)

52. (Currently Amended) A transducer-based sensor system, comprising:  
a transducer array implemented within a microchip, the transducer array including a plurality of transducers, where at least one transducer in the transducer array is configured to have a sample material attached thereto;  
an output processing subsystem coupled with the transducer array; and  
a selector coupled with the transducer array and configured to selectively activate transducers within the transducer array by applying an enabling signal to the transducer array for at least one, but less than all, of the transducers, such that the transducer array includes at least one selected transducer and at least one unselected transducer, where:

for a selected transducer, application of the enabling signal enables a transmission path between the selected transducer and the output processing subsystem, thereby permitting output signals to be transmitted from the selected transducer to the output processing subsystem; and  
~~the transducer array is configured to isolate any unselected transducers from the output processing subsystem, where such isolation is obtained by disabling the transmission paths, thereby substantially preventing output signals from being transmitted from the unselected transducers to the output processing subsystem~~  
**where the transducer array includes a local drive signal generator for each transducer of the transducer array, and where activating one or more of the transducers within the transducer array includes closing a switch between the transducer to be activated and the local drive signal generator associated with such transducer.**

53. (Previously Presented) A transducer-based sensor system, comprising:  
a transducer array including a plurality of transducers;  
an output processing subsystem coupled with the transducer array; and  
a selector coupled with the transducer array and configured to selectively activate transducers within the transducer array by applying an enabling signal to the transducer array for at least one, but less than all, of the transducers, such that the transducer array includes at least one selected transducer and at least one unselected transducer, where:

for a selected transducer, application of the enabling signal enables a transmission path between the selected transducer and the output processing subsystem, thereby permitting output signals to be transmitted from the selected transducer to the output processing subsystem;

the transducer array is configured to isolate any unselected transducers from the output processing subsystem, where such isolation is obtained by disabling the transmission paths, thereby substantially preventing output signals from being transmitted from the unselected transducers to the output processing subsystem;

a local drive signal generator for each transducer, where the selector is configured to control transducer activation for each transducer by permitting drive signals to be applied from the local drive signal generator to each selected transducer, and by preventing drive signals from being applied from the local drive signal generator to each unselected transducer; and

a switch coupled between each transducer and each transducer's local drive signal generator, the switch being configured to close if the transducer is selected, and to open if the transducer is unselected.

54. (Previously Presented) A transducer-based sensor system, comprising:

- a transducer array including a plurality of transducers, where at least one transducer in the transducer array is configured to provide both bulk wave and surface wave modes of operation;
- an output processing subsystem coupled with the transducer array; and
- a selector coupled with the transducer array and configured to selectively activate transducers within the transducer array by applying an enabling signal to the transducer array for at least one, but less than all, of the transducers, such that the transducer array includes at least one selected transducer and at least one unselected transducer, where:
  - for a selected transducer, application of the enabling signal enables a transmission path between the selected transducer and the output processing subsystem, thereby permitting output signals to be transmitted from the selected transducer to the output processing subsystem; and
  - the transducer array is configured to isolate any unselected transducers from the output processing subsystem, where such isolation is obtained by disabling the transmission paths, thereby substantially preventing output signals from being transmitted from the unselected transducers to the output processing subsystem.

55. (Currently Amended) A transducer-based sensor system, comprising:  
a transducer array including a plurality of transducers configured to be placed into operative proximity with a sample material, and configured to produce electrical output based upon drive signals applied to the transducers and upon the sample material, where at least one transducer in the transducer array is a surface acoustic wave device;  
an output transmission path associated with each transducer, each output transmission path being defined between its associated transducer and an output processing subsystem configured to receive electrical output from the transducers; and  
a selector configured to control activation and deactivation of portions of the transducer array by enabling and disabling the output transmission paths such that each output transmission path is either enabled, thereby allowing transmission of electrical output from the respective transducer to the output processing system, or disabled, thereby preventing transmission of electrical output from the respective transducer to the output processing system; **and**  
**where the transducer array includes a local drive signal generator for each transducer of the transducer array, and where activating one or more of the transducers within the transducer array includes closing a switch between the transducer to be activated and the local drive signal generator associated with such transducer.**

56. (Cancelled)